

# 2016

## WinRobot Manual



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# WinRobot Manual

**Version 2.05**

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## Table of Contents:

Version 2.05 .....	2
WinRobot .....	6
Axis Info: .....	6
Process .....	6
Status: .....	7
Joystick .....	8
Relay .....	8
Working Area: .....	8
Status line mode: .....	8
Status line serial: .....	8
Status line Ethernet: .....	8
Status line error: .....	9
CPC motion controller status: .....	9
Axis Position Graph .....	9
Manual Run <F3> .....	10
Manual Start Program <F2> .....	10
Run to Zero Point <F11> .....	11
Auto Sync .....	11
User Code Form .....	11
Programming .....	11
Edit Program .....	12
Goto position absolute in time: .....	13
Goto position absolute at speed: .....	14
Goto point in time .....	14
Goto point at speed .....	14
Pause .....	14
Wait .....	15
Link .....	15
Relay .....	16
Acceleration .....	16
Comment .....	16
General .....	17
Points .....	17
P-gain .....	18
P-gain (Advance) .....	18
Random Points .....	20
Setup User Codes Form .....	21
Functions: .....	21
Setup User Profile Form .....	22
Functions: .....	22
Backup .....	23
Machine Log Form .....	24
Error Log Form .....	25
Print Form Programs .....	26
Print Form Statistic .....	27
Error Dialogue Box .....	28
Settings .....	29
Setup - Axes .....	29
Setup - System .....	31

Setup - Carousel .....	34
Setup - Synchronization .....	36
Setup - Joystick .....	38
About.....	40
Edit Texts .....	41
Calculate Carousel Centre.....	42
Carousel Setup .....	43
Axis Calibration .....	44
Sync.....	45

## Figures:

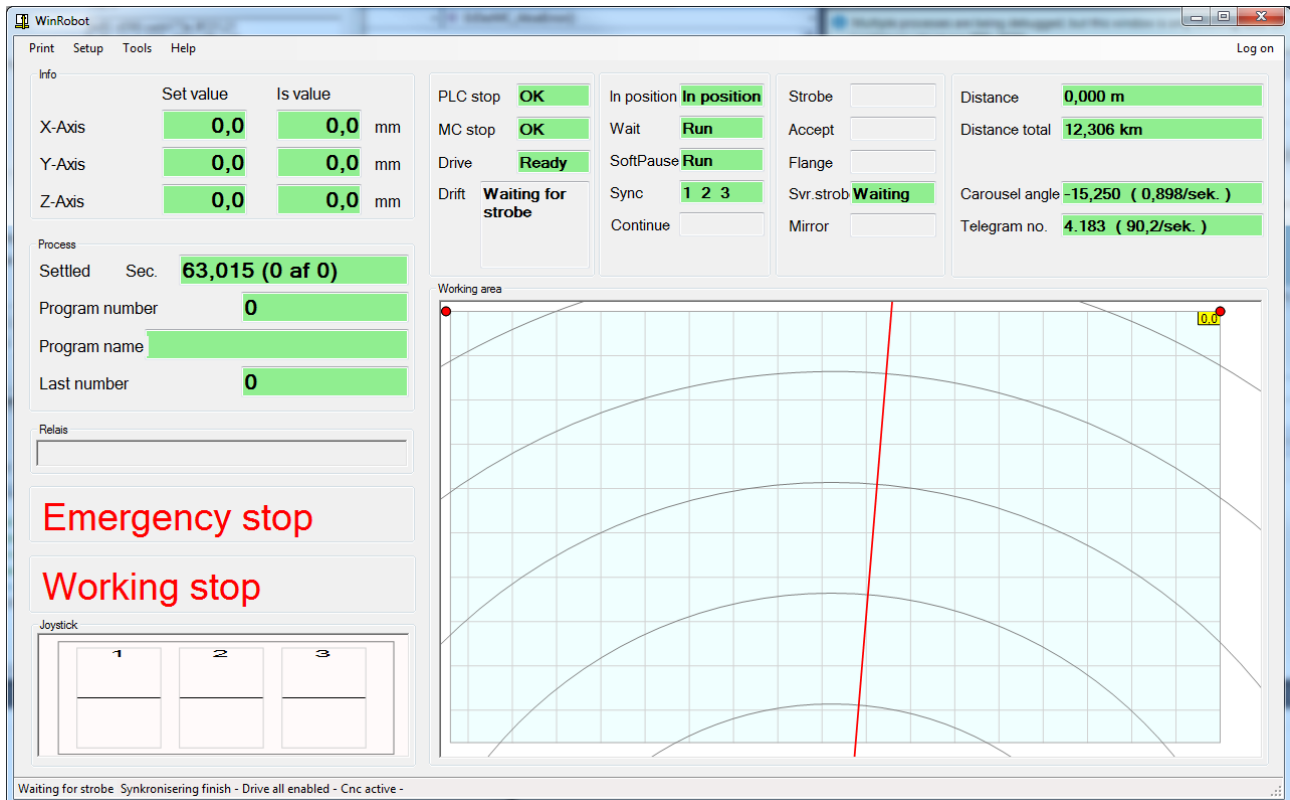
Figure 1 Main Panel .....	6
Figure 2 Axis position graph.....	9
Figure 3 Manual Start Program.....	10
Figure 4 Enter User Code.....	11
Figure 5 Edit Programs .....	12
Figure 6 Programming Menu .....	12
Figure 7 Programming Sub Menu.....	13
Figure 8 Command goto in time .....	13
Figure 9 Command goto at speed .....	14
Figure 10 Command Pause For.....	14
Figure 11 Command Link .....	15
Figure 12 Command Relay .....	16
Figure 13 Command Acceleration .....	16
Figure 14 Command Comment.....	17
Figure 15 Setup of Points.....	17
Figure 16 Setup P-gain.....	18
Figure 17 P-Gain (Advance) .....	18
Figure 18 Random Points.....	20
Figure 20 Setup User Codes.....	21
Figure 21 Setup User Profiles .....	22
Figure 22 Delete User Profile .....	23
Figure 23 Backup Form .....	23
Figure 24 Machine Log Form .....	24
Figure 25 Error Log Form.....	25
Figure 26 Print Form Programs .....	26
Figure 27 Print Form Statistic.....	27
Figure 28 Error Dialogue Box .....	28
Figure 29 Setup - Axes.....	29
Figure 30 Setup - System .....	31
Figure 31 Setup - Carousel.....	34
Figure 32 Setup - Synchronization.....	36
Figure 33 Setup - Joystick.....	38
Figure 34 About .....	40
Figure 35 Edit Texts.....	41
Figure 36 Calculate Carousel Centre .....	42
Figure 37 Carousel Setup.....	43
Figure 38 Axis Calibration.....	44
Figure 39 Axis Calibration Distance.....	45
Figure 43 Missing Sync .....	46

**Tables:**

Table 1 Controller status ..... 9

Table 2 States ..... 25

# WinRobot



**Figure 1 Main Panel**

The main form contains a lot of status information regarding the condition of the robot.

## Axis Info:

### X,Y,Z axes

This frame contains the current Set and Is values. The names of the individual axes can be altered in the “Settings menu” on the “Axes” tab, see page 29

## Process

### Settled:

The field indicates the progress of the robot in the selected program. The current line number being run and the number of lines in the selected program is shown in the parenthesis.

### Program number:

The field shows the current program number sent along with the latest ”strobe”. If ”Run program after completion” is selected (see page 31) this field will be updated with the program number, when it is executed.

### Program name:

The field shows the current program name.

The program name for each program is set in the programming form. See page 11.

**Status:****Distance:**

This field shows how far the robot has run since start up.

**Distance total:**

This field shows how far the robot has run since installation.

**Telegram no.:**

The value of this field is incremented by 1 for each telegram to and from the CPC motion controller. The average communication speed (over a 5 second period) is calculated and shown in the parenthesis.

**Carousel angle:**

This field shows the current angle of the carousel since the latest "Servo strobe".

**PLC/MC stop:**

These fields show the status for stopbit for PLC and MC respectively.

**Operation:**

This field shows the operational status. E.g. "Waiting for strobe", "Manual" ....

**In position:**

When the distance between the Set and Is values for each axis is less than the specified distance in the settings form, this field will show "In position".

**Wait:**

If the robot is waiting for the external wait signal it will be shown here.

**Pause:**

This field will show the status of the input "Pause".

**Sync:**

This field will show which axes are currently shown on the synchronization sensors.

**Strobe:**

This field indicates the status of the strobe input.

**Drive:**

This field shows whether the drives are ready.

**Continue:**

This field shows whether the robot is waiting for the external continue signal.

**Flange:**

This field indicates when if the robot is situation above the flange sensor.

**Joystick**

This field shows the current position on the joystick. Please note! The position of the joystick is only active at "Manual mode" and "programming".

**Relay**

This field shows the current position of the relays

**Working Area:**

This graphic will show the working area of the robot. The little red circle in the working area shows the current position (Axis 1 and 2) as 0,0 at the top left hand corner. The little red circle to the right is Axis 3.

The horizontal and vertical grey lines make up a grid showing 100 millimeters resolution.

If the carousel function is active grey circular arcs will also be visible, showing the outline of the carousel. There are 250 millimeters between the arcs, starting at the center of the carousel.

By double clicking or right clicking the mouse in this field the graphic will be replaced by a graph showing the position of the axes as a function of time.

See **Axis Position Graph** page 9.

**Status line mode:**

The status field at the bottom left corner shows which "mode" the robot is in.

The options are:

- **"Post boot"** mode is the mode the robot starts in, while it is not synchronized.
- **"Waiting for strobe"** mode indicates that the robot is waiting for a strobe.
- **"Getting program"** is shown temporarily while WinRobot is getting the selected program from the database.
- **"Sending program"** indicates that WinRobot is sending the program to the CPC motion controller.
- **"Waiting for program end"** is shown while the selected program is in progress.
- **"Waiting for completion"** is shown after the selected program has run until a possible "go to 0-point after completion" is completed.
- **"Manual Mode"** is shown while the robot is in manual mode.
- **"Sync in progress"** is shown while the robot is syncing.

**Status line serial:**

"Joystick error" will show in this field if there is a communication error to the control unit.

**Status line Ethernet:**

"Ethernet error" will show in this field if there is a communication error to the CPC motion controller. Possible errors can be incorrectly set up IP / port address in the "Settings" form, a cable error or that the CPC is missing power or initialization.



**Status line error:**

Possible error information from the CPC motion controller is shown to the right of the mode information. In case of an error "Motion error" plus an error code, followed by the axis or axes concerned is shown.

**CPC motion controller status:**

The following status information can be shown in this field:

Information	Description
OK	Motion controller is OK
Sync in progress	Sync is in progress
Sync completed	Sync is completed
Program end	Robot program execution completed
Drive error	Error from Motion controller. Followed by one or more additional error messages.
Drive all enabled	Drive active and ready to run.
Jog active	Feedback from Motion controller stating it is in manual mode.
Cnc active	CNC is initialized.
Homing active	Stating that the Motion controller is synchronized.

Table 1 Controller status

**Axis Position Graph**

By double clicking the mouse in the working area field, the below graph (oscilloscope) is shown.

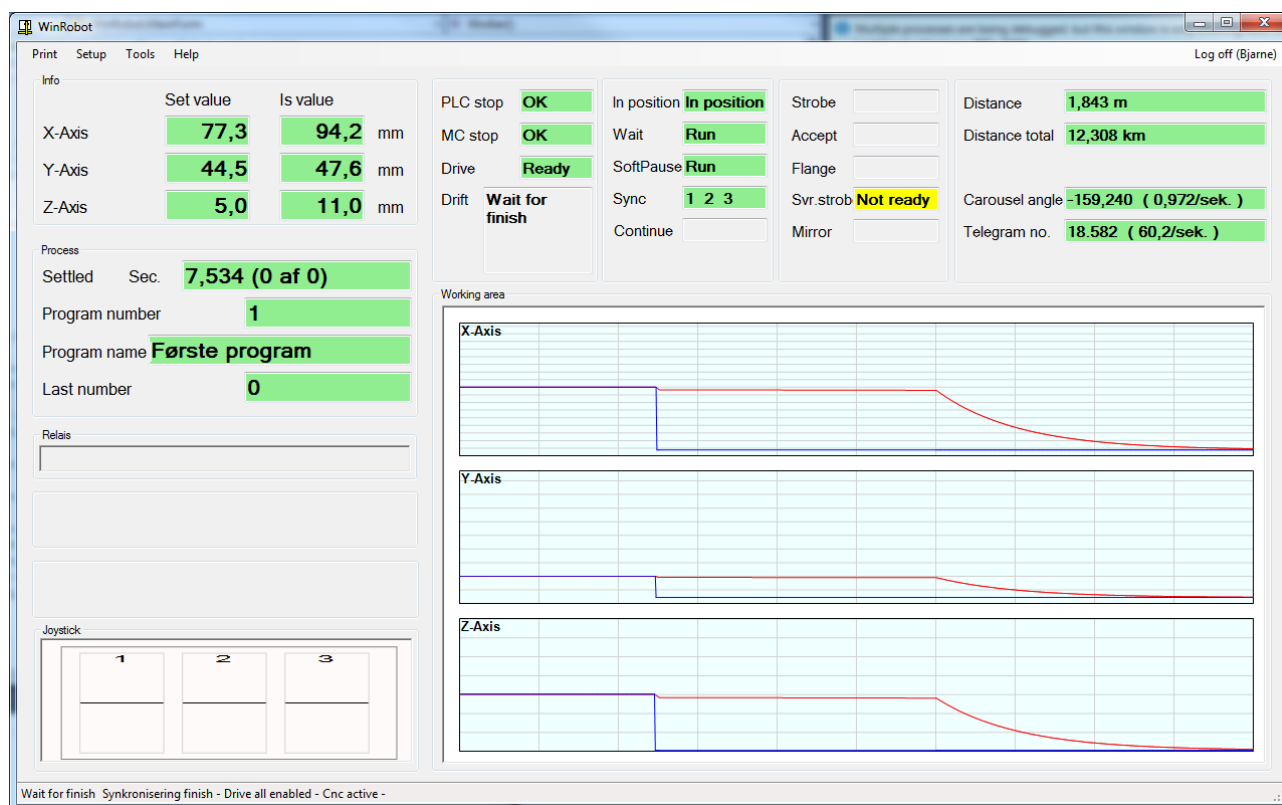
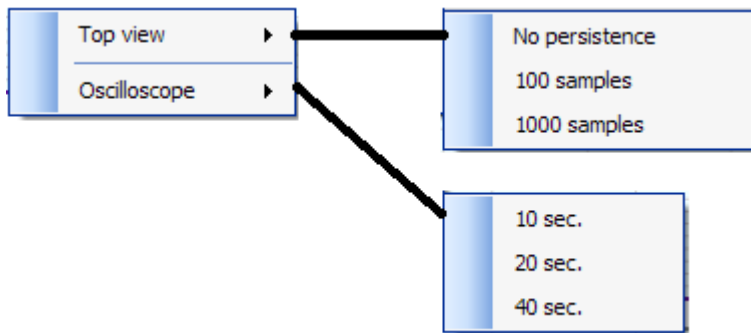


Figure 2 Axis position graph

By right clicking the mouse the below context menu will appear:



In this menu it is possible to select the resolution of the two graphs. Note that WinRobot "records" 1000 samples regularly, so it is not always possible to show 40 seconds.

## Manual Run <F3>

This function makes it possible to move the robot using the joystick.

Manual run is possible both before and after a synchronization.

### Before synchronization:

Before synchronization the robot will not know the working area and can therefore run against the limit sensors, so watch the speed.

### After Synchronization:

The robot knows the working area and will therefore be able to move within it. When the axes approach the outer edges of the working area the speed will automatically be reduced, to finally stop at the edge.

The control panel also has a "Manual" key to activate this function.

## Manual Start Program <F2>

This function makes it possible to start a program as if it was a strobe.

The function cannot be activated unless the robot is synchronized and waiting for strobe.

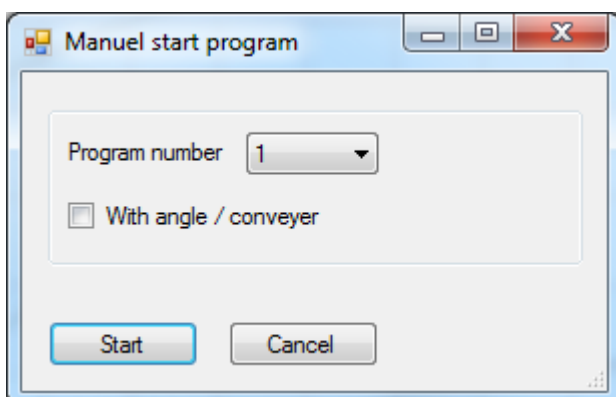


Figure 3 Manual Start Program

Only program numbers which exist will be shown in the dialogue box.

## Run to Zero Point <F11>

This function can be activated by a bit from the PLC, The menu, the <F11> key on the PC keyboard and from the “zero point” key on the control unit.

The function moves the robot to the point, which has been set as the zero point in the menu ”Settings points” see page 17, and at the speed, which has been set in the “System” pane on the Settings form.

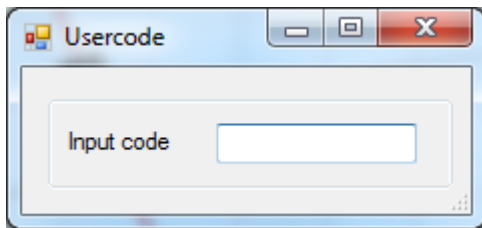
## Auto Sync

When selecting this menu item, the robot will carry out a synchronization of all axes. Amongst other things the order can be changed in the Settings form (see page 36). Many functions in WinRobot are depending on a successful synchronization.

## User Code Form

In order to gain access to the menu system a user code has to be entered.

The user code is entered in the ”User code” dialogue box, which appears when the user selects the menu item ”Log on” or use the shortcut key <CTRL> + <TAB>.



**Figure 4 Enter User Code**

Press <ENTER> after typing the user code.

To log off again use the menu item or short cut key again.

The super user can create new users in the form “Setup user codes”.

See ”Setup of user codes”

## Programming

Programming of the robot is carried out by selecting a number of commands for the robot to execute.

One of the most important commands is “Goto”, which asks the robot to move to a given point at a selected speed or time.

Line	Command	Parameters	Time
1	Acceleration		50,0 %
2	Go to (absolut)	793,5 621,4 300,0	3,000 Sec.
3	Wait		
4	Go to (absolut)	761,5 413,8 300,0	1,000 Sec.

Figure 5 Edit Programs

**Program number:**

In this field an existing program can be selected.

**New...:**

In order to create a new program enter a non-existing program number in the "Program number" field and click the "New..." button.

**Name:**

Type a telling name, which will be shown, when the program is executed or printed.

**Servo angle:**

When the program is created/edited the WinRobot program needs to know under which angle the positions are given. When a mould has to be programmed the carousel has to be placed so that the mould is placed within the working area.

**Transfer:**

With this button the current angle from the main form can be transferred to the "Servo angle" of this program.

**Edit Program**

To mark a line click on the line with the mouse or use the up/down arrow keys.

When the user right clicks with the mouse on the line, the below menu will appear:

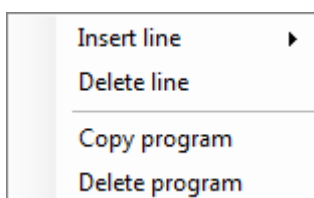


Figure 6 Programming Menu

**Delete line:**

This function deletes the marked line in the program and the subsequent lines are moved up.

**Copy line:**

This function copies a line.

### Copy program

This function copies the selected program.

### Delete program:

This function deletes the active program.

### Insert line:

By selecting "Insert Line" the below sub menu appears:

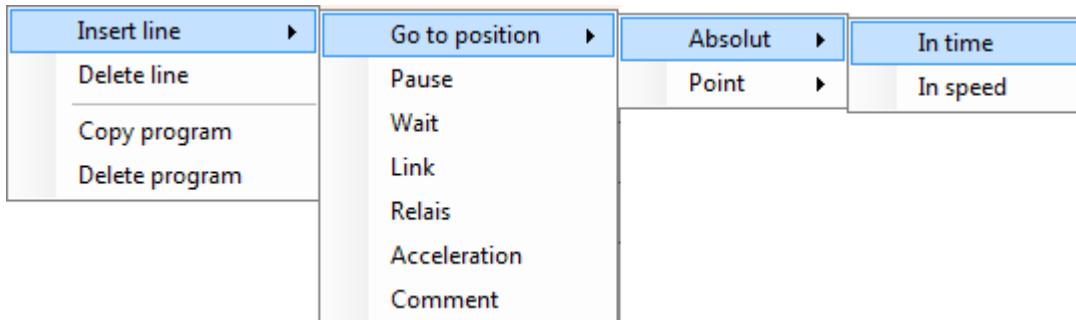


Figure 7 Programming Sub Menu

The following lines can be inserted in the programs:

### ***Goto position absolute in time:***

3	Go to (absolut)	900,0	200,0	302,0	2,000 Sec.
---	-----------------	-------	-------	-------	------------

This command asks the robot to run to the desired position in the selected time. If the robot is asked to run 1 meter in 1 second, the speed in the middle of the running distance will be greater than 1 m/s. This is due to the fact that some time is used to accelerate and decelerate. The most important thing is that the robot reaches the desired position in the selected time, regardless of the acceleration value.

When double clicking this line a dialogue box as shown to the right will appear. Tick "Use joystick" if the position is to be found/set using the joystick. Note! The robot moves physically.

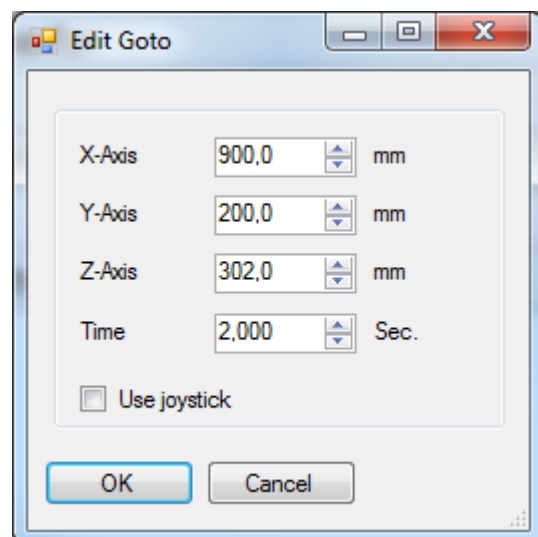


Figure 8 Command goto in time

***Goto position absolute at speed:***

5	Go to (absolut)	123,0	43,0	100,0	100,8 mm/Sec.
---	-----------------	-------	------	-------	---------------

This command asks the robot to run to the desired position at the selected speed. If the robot is asked to run 1 meter in 1 second, the speed in the middle of the running distance will be greater than 1 m/s. This is due to the fact that some time is used to accelerate and decelerate. The most important thing is that the robot reaches the desired position in the selected time, regardless of the acceleration value.

When double clicking this line a dialogue box as shown to the right will appear. Tick "Use joystick" if the position is to be found/set using the joystick. Note! The robot moves physically.

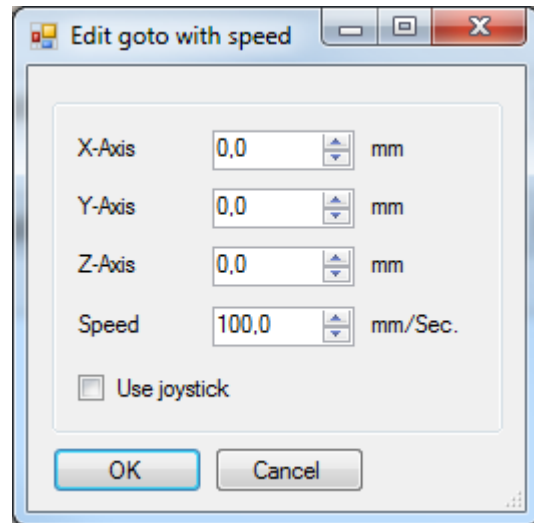


Figure 9 Command goto at speed

***Goto point in time***

10	Goto point 1	2,3 Sec.
----	--------------	----------

This command asks the robot to run to the desired position (shown here as point 1) in the selected time.

Rules for the selected time are the same as above.

***Goto point at speed***

11	Goto point 8	100,0 mm/Sec.
----	--------------	---------------

This command asks the robot to run to the desired position (shown here as point 8) at the selected speed.

Rules for the selected speed are the same as above.

***Pause***

6	Pause for	1,230 Sec.
---	-----------	------------

This command tells the robot to pause for the selected time.

When double clicking this line a dialogue box appears, in which it is possible to set the time.

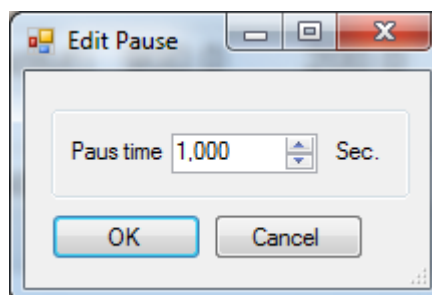


Figure 10 Command Pause For

**Wait****4 Wait**

The command stops the robot until the input "Continue" is activated. The command is used when there is a need to synchronize the onward execution with an external event.

**Link****9 Link no 6**

This command inserts a link command.

The selected program is executed at this point in the program, before the rest of the program continues.

Be careful not to link to a program, which again links to itself.

Example: If program 1 links to program 2 and program 2 links to program 1.

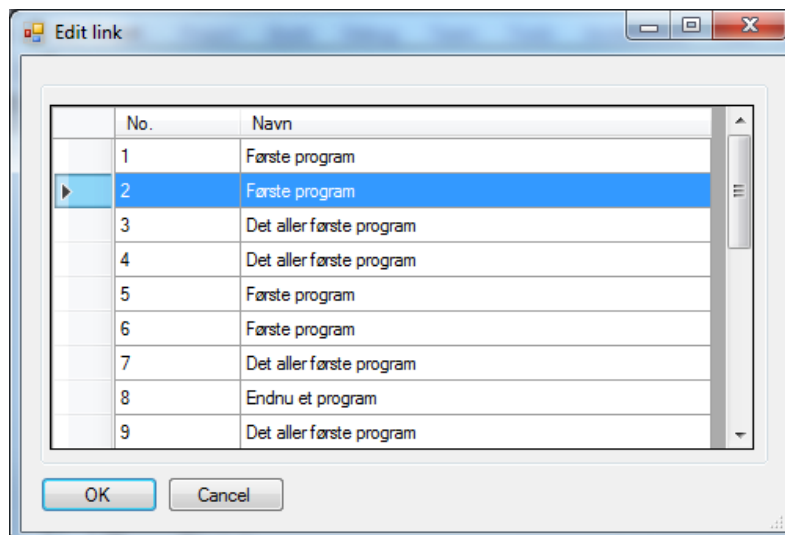


Figure 11 Command Link

## Relay

7	Relais	Off	On	Off	Off	On	On	Off	Off
---	--------	-----	----	-----	-----	----	----	-----	-----

This command activates the 8 relay output which can be connected to the robot.

The relay position can be set when double clicking this line.  
The relay position form is pictured to the right.

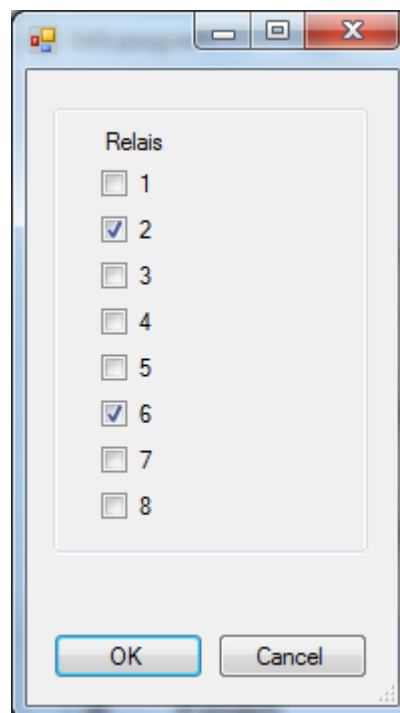


Figure 12 Command Relay

## Acceleration

11	Acceleration	1,2 m/s <sup>2</sup>
----	--------------	----------------------

The command determines the acceleration and deceleration at start and stop.

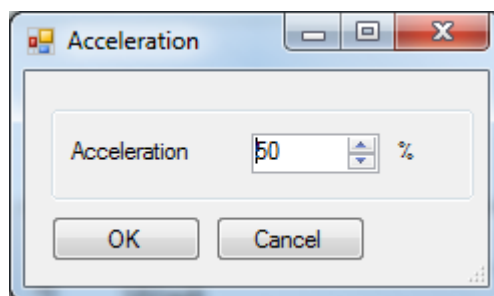


Figure 13 Command Acceleration

## Comment

10	Open MK
----	---------



This line shows an explanatory text for the line. The command is not sent to the CPC.

The comment can be edited when double clicking this line.

The comment form is pictured to the right.

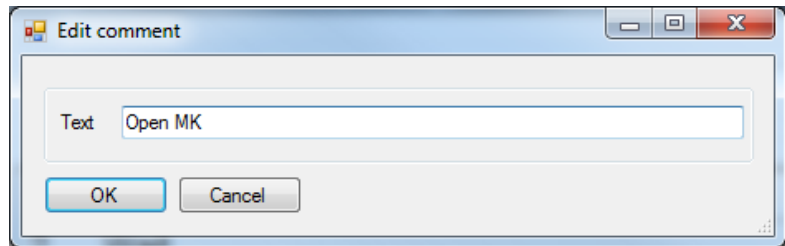


Figure 14 Command Comment

## General

If a line is marked (grey) and <ENTER> is pressed the robot will move to the position. This only applies to “Goto” commands.

## Points

In this form fixed positions can be set.

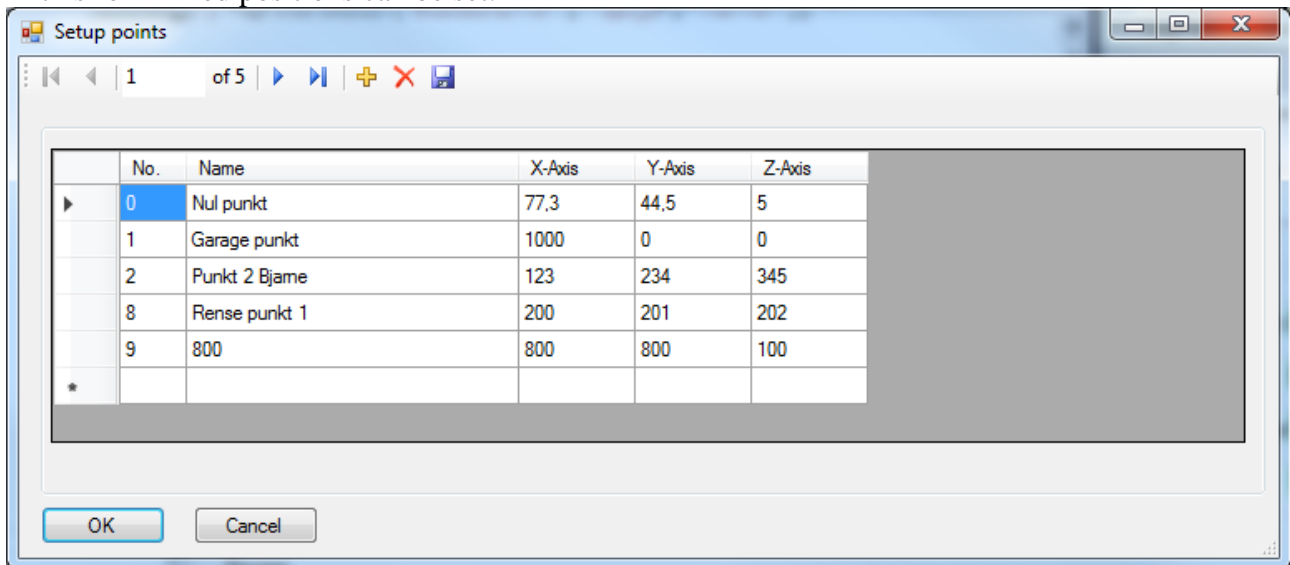


Figure 15 Setup of Points

In order to run to one of the points, double click the mouse on the far left, next to the desired point.

## P-gain

In this form the gain can be set.

Figure 16 Setup P-gain

Note! The amended P-gain is not transferred to the PC until the “OK” button is clicked.

## P-gain (Advance)

Figure 17 P-Gain (Advance)

By using this form to set the P-gain it is possible to test the new setting and show the movement graphically.

Choose an **axis**, set the run distance using the **From** and **To** fields. Also set the **Speed**, **Acceleration** and **Gain**.

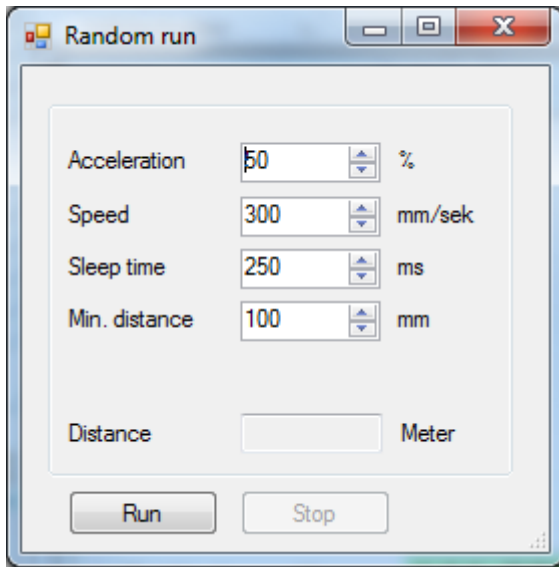
Click the **Run** button.

The robot will start to execute:

- Setting the selected acceleration
- Pause command at 500 ms,
- Run to the **To** position
- Pause command for the selected **Pause** time.
- Run back to the **From** position
- Pause command at 500 ms,

Combining a visual observation of the physical movements of the robot and a study of the graph it is possible to assess whether the P-gain should be increased or decreased.

## Random Points



**Figure 18 Random Points**

With the form it is possible to conduct a long term test of the robot. Fill out the fields and click "Run".

The program will generate a new and random position within the working area and run to this position at the selected speed. The program will ensure that the minimum distance is the selected distance.

When the position has been reached the selected pause time will be executed before generating a new random position and the whole process continues.

Click "Stop" to cancel the run.

The field "Distance" shows the current total distance.

Note! If the acceleration is set at a low value, the minimum distance has to be increased as it is not otherwise possible to achieve acceleration versus distance.

## Setup User Codes Form

This form is used to create new users with individual user codes, so that they can log onto the system.

The user name is amongst other things used to log onto the machine log and to make changes to the programs.

	Name	Code	Profile
▶	System		Administrator
	Bjame	bhm	Administrator
	Christina	5678	Produktion
	Lene	2233	Lager
	Tim	43254435	Administrator
*			

Profiles

Save

OK

Figure 19 Setup User Codes

The table shows the created users.

### Functions:

- **Create new user:**  
In the bottom line marked "\*" enter name and code and select a profile.  
Click "Save".
- **Edit a user:**  
Select the desired line, enter a new text and select a new profile.  
Click "Save".
- **Delete a user:**  
Click to the far left of the user you wish to delete (so the entire row is marked).  
Press the "DEL" key.  
Click "Save".

**Note!** The user "System" cannot be deleted.

## Setup User Profile Form

To create new profiles click the "Profiles..." button and the form below will appear:

	id	Name	Programming	Setup	Machinelog	Print	User codes	Manuel	Test	Manuel star
▶	1	Administrator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	2	Produktion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	3	Lager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Save OK

Figure 20 Setup User Profiles

A profile provides access to one or more functions in WinFlow. The individual profiles are identified using a name of your choice.

The "id" is automatically assigned to the profile by the system and cannot be changed.

### Functions:

- Create new profile:**  
 In the bottom line marked "\*" enter a name and tick all the functions the profile should have access to.  
 Click "Save".
- Edit a profile:**  
 Select the desired line, enter a new text and/or tick/untick functions.  
 Click "Save".
- Delete a profile:**  
 Click to the far left of the profile you wish to delete (so the entire row is marked).  
 Press the "DEL" key.  
 Click "Save".  
 If you attempt to delete a profile, which is in use, you will receive an error message when clicking "Save".

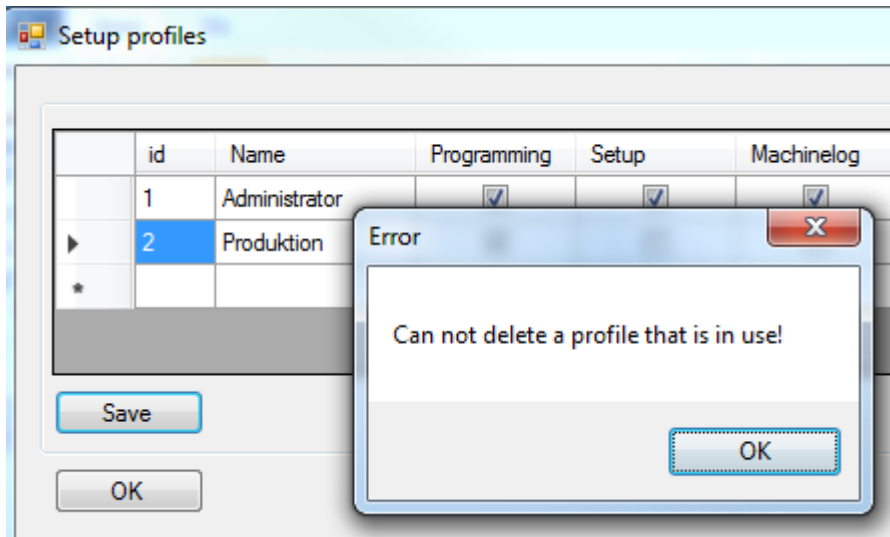


Figure 21 Delete User Profile

## Backup

This function creates a backup of the database.

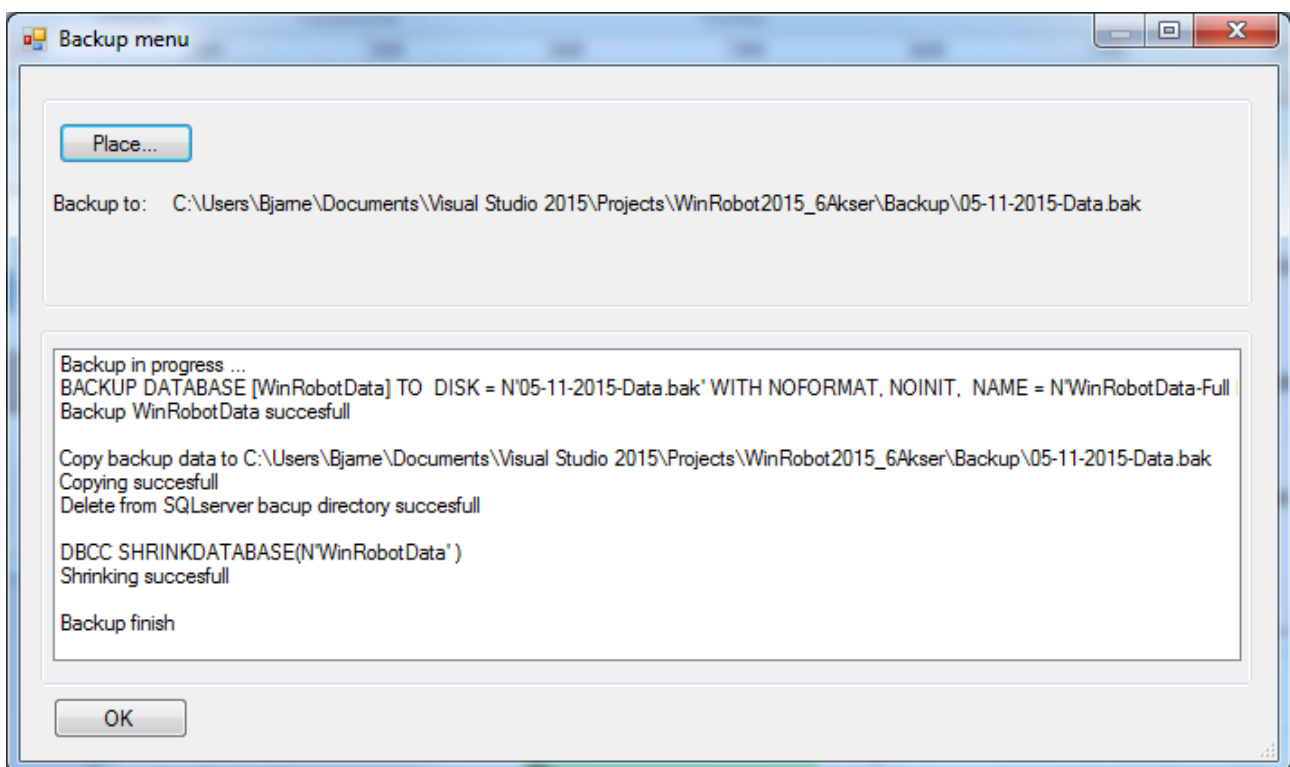


Figure 22 Backup Form

In the backup form it is possible to create a backup of the active database.

The database contains all the robot programs and settings necessary to recreate the system after a possible breakdown.

Remember to backup regularly.

## Machine Log Form

The screenshot shows a window titled "Maskin Log" with a toolbar at the top containing navigation and action icons. Below the toolbar is a table with the following columns: Navn, Date, da, Activate, and Reason. The table contains 18 rows of log entries. The first row is highlighted in blue. At the bottom of the window are "OK" and "Cancel" buttons.

Navn	Date	da	Activate	Reason
Bjame	5. november 2015 20:1...	Vis maskinlog	<input checked="" type="checkbox"/>	
Bjame	5. november 2015 20:1...	FejlLog Menu	<input type="checkbox"/>	End
Bjame	5. november 2015 20:1...	FejlLog Menu	<input checked="" type="checkbox"/>	Activated
Bjame	5. november 2015 20:1...	Backup Menu	<input type="checkbox"/>	End
Bjame	5. november 2015 20:1...	Backup Menu	<input checked="" type="checkbox"/>	Activated
Bjame	5. november 2015 20:1...	Backup Menu	<input type="checkbox"/>	End
Bjame	5. november 2015 20:1...	Backup Menu	<input checked="" type="checkbox"/>	Activated
Bjame	5. november 2015 20:1...	Menuen Indstilling	<input type="checkbox"/>	End
Bjame	5. november 2015 20:1...	Menuen Indstilling	<input checked="" type="checkbox"/>	Activated
Bjame	5. november 2015 20:1...	Backup Menu	<input type="checkbox"/>	End
Bjame	5. november 2015 20:1...	Backup Menu	<input checked="" type="checkbox"/>	Activated
Bjame	5. november 2015 20:1...	Backup Menu	<input type="checkbox"/>	End
Bjame	5. november 2015 20:1...	Backup Menu	<input checked="" type="checkbox"/>	Activated
Bjame	5. november 2015 20:1...	Indstilling bruger	<input type="checkbox"/>	End
Bjame	5. november 2015 20:0...	Indstilling bruger	<input checked="" type="checkbox"/>	Activated
Bjame	5. november 2015 20:0...	Log på	<input checked="" type="checkbox"/>	Bjame
System	5. november 2015 20:0...	Indtast kode	<input checked="" type="checkbox"/>	Activated
System	5. november 2015 20:0...	Opstart	<input checked="" type="checkbox"/>	222

**Figure 23 Machine Log Form**

This form shows a log of all the recent events and forms used.

A tick in the column “Activate” indicates that the event has happened, if there is no tick it indicates that the event has been stopped or that the user has left the form.



## Error Log Form

id	Tekst	State	Dato
46098	Error No 19 - X-axis uden for arbejdsområde - Line number 0	VentPaaAfslutProgram	25-01-2012 08:26
46097	Error No 9 - Drive error axis 1 - Drive Negative limit switch has triggered .... Basic drive functions .... Qui...	VenterPaaStrobe	25-01-2012 08:25
46096	Error No 3 - Motion Controller error axis 1 - Motion Position outside of permissible range (SWLimit)	VentPaaAfslutProgram	25-01-2012 08:25
46095	Error No 17 - Acceleration - Line number 3	VenterPaaStrobe	20-01-2012 13:04
46094	Error No 17 - Acceleration - Line number 3	VenterPaaStrobe	20-01-2012 13:03
46093	Error No 17 - Acceleration - Line number 3	VenterPaaStrobe	20-01-2012 13:02
46092	Error No 11 - Drive error axis 3 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46091	Error No 10 - Drive error axis 2 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46090	Error No 9 - Drive error axis 1 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46089	Error No 11 - Drive error axis 3 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46088	Error No 10 - Drive error axis 2 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46087	Error No 9 - Drive error axis 1 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46086	Error No 11 - Drive error axis 3 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46085	Error No 10 - Drive error axis 2 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46084	Error No 9 - Drive error axis 1 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46083	Error No 11 - Drive error axis 3 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46082	Error No 10 - Drive error axis 2 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46081	Error No 9 - Drive error axis 1 - Drive DC-bus undervoltage .... Motor control .... Trouble	PostBoot	20-01-2012 12:26
46080	Error No 5 - Motion Controller error axis 2 - Motion Error during transmission to the drive - See error sum...	PostBoot	20-01-2012 11:51

**Figure 24 Error Log Form**

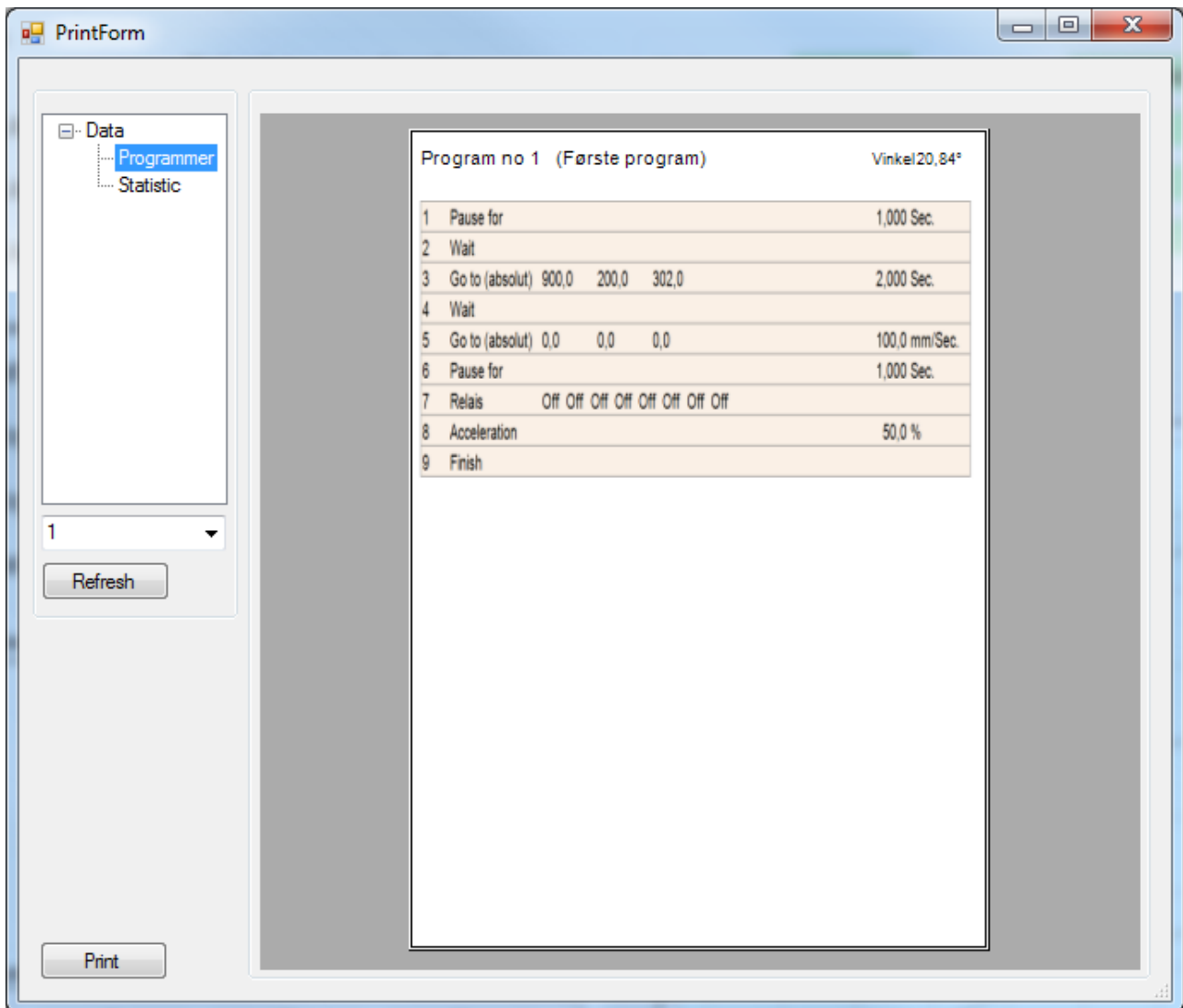
This form shows all the errors generated in WinRobot.

The column "State" indicates the mode/state of WinRobot when the error occurred.

ProcessState's
PostBoot, VenterPaaStrobe, HentProgram, SendProgram, VentPaaAfslutProgram, VentPaaAfslutAfslut, ManuelMode, AutoSynkMode, ManuelModeAfslut
AutoSynkState's
Start, WaitForStart, InProcess, Finish

**Table 2 States**

## Print Form Programs



The screenshot shows a software window titled "PrintForm". On the left, there is a sidebar with a tree view containing "Data", "Programmer" (highlighted in blue), and "Statistic". Below the tree is a dropdown menu showing "1" and a "Refresh" button. At the bottom left is a "Print" button. The main area displays a table of programs. The first program is "Program no 1 (Første program)" with a parameter "Vinkel20,84°". The table lists 9 steps:

Step	Command	Value
1	Pause for	1,000 Sec.
2	Wait	
3	Go to (absolut)	900,0 200,0 302,0 2,000 Sec.
4	Wait	
5	Go to (absolut)	0,0 0,0 0,0 100,0 mm/Sec.
6	Pause for	1,000 Sec.
7	Relais	Off Off Off Off Off Off Off
8	Acceleration	50,0 %
9	Finish	

**Figure 25** Print Form Programs

The robot programs can be printed from this form.

## Print Form Statistic

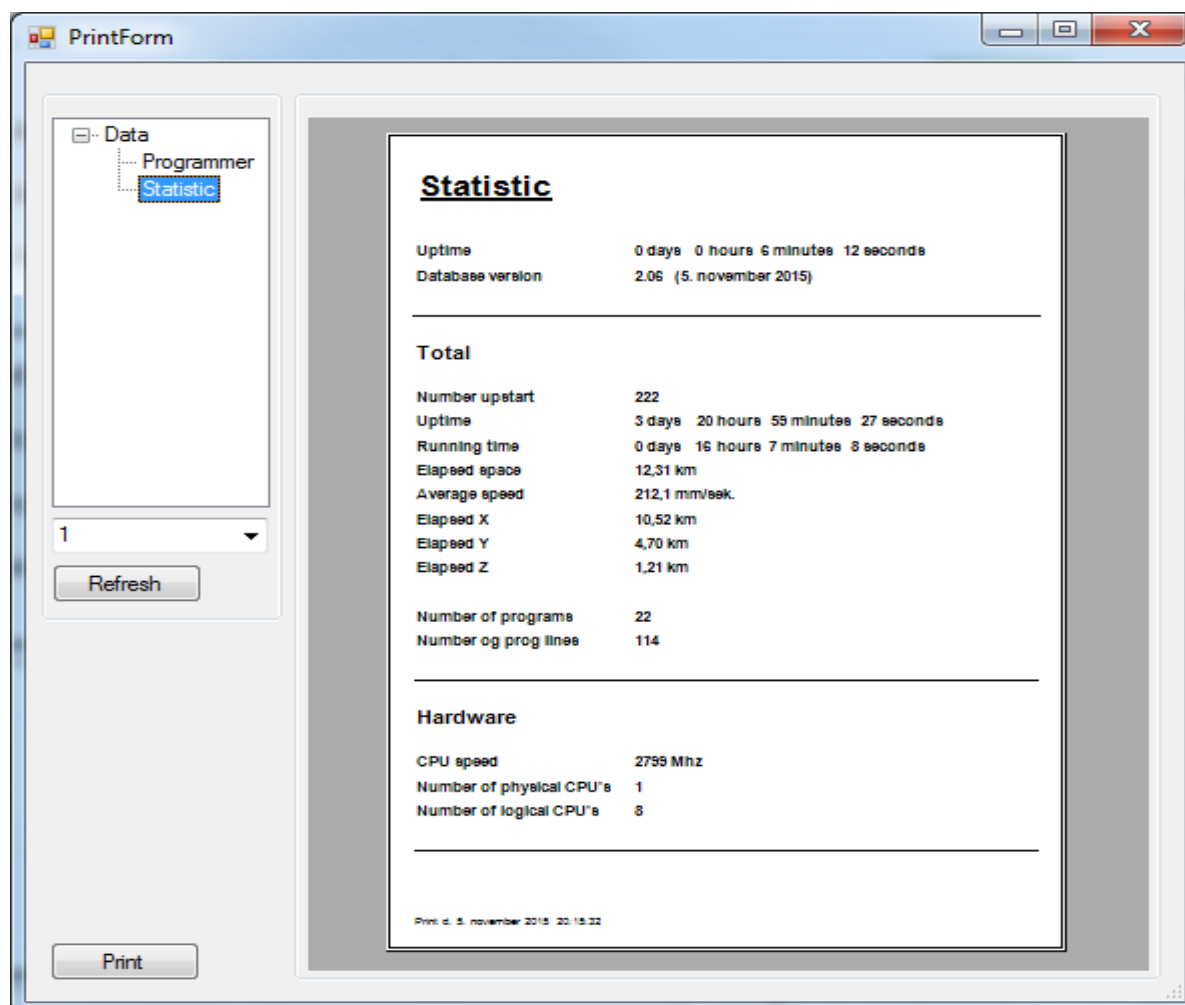


Figure 26 Print Form Statistic

The printout shows the following data:

<b>Number upstart</b>	is the number of times the WinRobot program has been started.
<b>Uptime</b>	is the total time the WinRobot has been running.
<b>Running time</b>	is the total time the axes have been moving.
<b>Elapsed space</b>	is the total distance the axes have run in the three dimensional space.
<b>Average speed</b>	is the elapsed space distance / run time.
<b>Elapsed X,Y,Z</b>	is the elapsed distance for each axis.
<b>Number of programs</b>	is the total number of robot programs in the database.
<b>Number of prog lines</b>	is the combined number of program lines in all the programs.
<b>Database version</b>	is the version number of the database.
<b>Most used</b>	is the command most frequently used.

## Error Dialogue Box

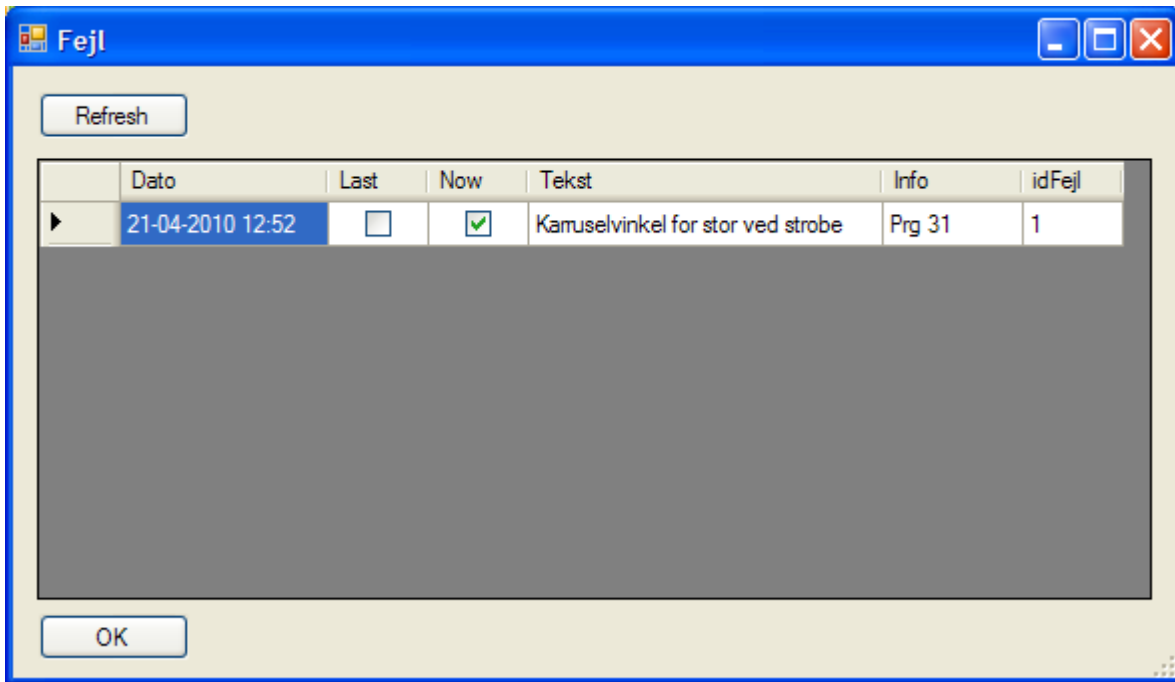


Figure 27 Error Dialogue Box

This dialogue box will appear in case of an error occurring in the WinRobot program or the servo drive/motion controller.

By pressing "Reset" / "Receipt" on the control cabinet the dialogue box will disappear.

## Settings

All system settings are set in this form.

### Setup - Axes

Axis	Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6
Acceleration (mm/s²)	5,00	4,00	4,00	0,01	0,01	0,01
Max. speed (mm/s)	1666	1666	1666	50	50	50
In position limit (mm)	3	3	3	10	10	10
Brake function	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name	X-Axis	Y-Axis	Z-Axis	Akse4	Akse5	Akse6
Axis offset (mm)	0,0	0,0	0,0	0,0	0,0	0,0
Mount inverse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AxisLength	1740	973	702	609	900	1200
Axis setup motor Pulse	3991251	2251651	3273603	1024	1024	1024
Axis setup distance	1760,00	993,00	722,00	10,30	10,30	10,30
	Measure...	Measure...	Measure...	Measure...	Measure...	Measure...
Output derate (%)	100			100		
Positionsgrense	50 mm					

OK Use

Figure 28 Setup - Axes

#### Acceleration:

Determines the maximum allowed acceleration before error for each axis in meters per second. If this limit is exceeded the motion controller will output an error message.

#### Max. Speed:

Determines the maximum speed for each axis. This value is the maximum speed that can be entered during programming of robot programs.

The value is also used as a limit value, when the robot is asked to run a distance in too short a time (high speed). In this case it is the motion controller that will output the error message.

**In position limit:**

When all axes are less than this distance from the respective set-values, the output is set “**In position**”. This function makes it possible for external units (e.g. the PLC) to ensure that the robot is in the desired position, and not heading there or prevented from reaching the position.

**Brake function:**

A tick tells the motion controller that there is a brake on this axis.

**Name:**

Enter the name of the axis here.

**Axis offset:**

Enter the number of millimeters (include a minus sign for negative numbers) to be added to the set-value, to get the is-value to the same position as the set-value in these fields. The axis offset is most often used on the Z-axis to compensate for gravity.

**Mount inverse:**

This setting makes it possible to invert the motor rotation, so that 0 millimeter starts at the opposite end of the axis.

**Axis length:**

This length determines the area within which the axis can work. The working length of the axis is thereby 0,0 mm to the set value. This length is also used as a maximum when entering programs.

**Axis setup motor pulse:**

Determines the number of pulses measured during the axis measurement. This value is sent to the motion controller.

**Axis setup distance:**

Determines the distance measured during the axis measurement. This value is sent to the motion controller.

**Output:**

Using this value the output to the motor can be limited. It can be advantageous to set this at a low value during testing. When the robot needs to be optimized (p-gain) or when the production is to be started this value should be set at 100% (full output).

## Setup - System

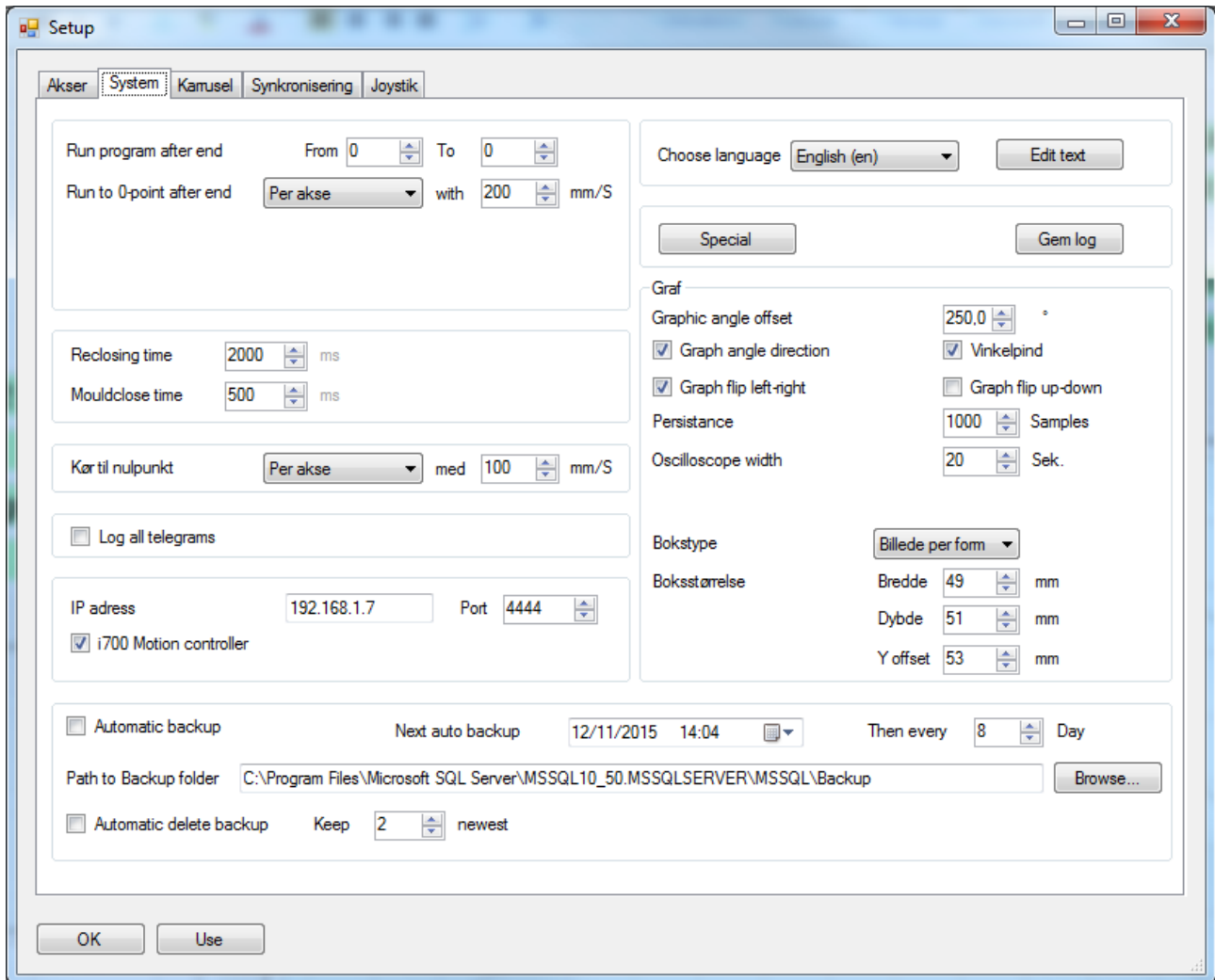


Figure 29 Setup - System

### Run program after end:

Enter a fixed program number, which is always to be executed after the program selected by the strobe has run.

If this field is set to 0, no program will be executed at the end.

It is possible to get WinRobot to execute various cleaning programs after each run by entering a number of programs within an area.

In the illustration the robot will start with program number 330, after the next run it is 331 and so it will continue until 334 has run, then program number 330 will run again as a cleaning program.

When both the “from” and “to” fields are set to the same number only this program number will be run as cleaning program.

### Run to 0-after end:

After completed execution (strobe program + program after end) it is possible to select whether the robot automatically runs to the 0-point, if a cleaning program has not been selected.

The options are:

**No:** Does not run to 0-point.

- Per axis:** Runs to 0-point, each axis separately. The order is the same as the order selected in the synchronization form.
- Direct:** Runs to 0-point with all axes in a straight line.

**At:**

This setting determines the speed with which the robot runs to the 0-point after completion.

**Reclosing time:**

This setting determines the time the robot uses to reclose after a work stop. Minimum 500 ms and maximum 5000 ms

**Mould close time:**

After the execution of a program the output "Mould close" is set for this time.  
A value between 0 and 5000 ms.

**Log all telegrams:**

When this is ticked all telegrams (the last 10.000) will be saved in a log file, for use in case of an error.

**IP address:**

Enter the IP address of the motion controller, in the format: xx.xx.xx.xx.

**Port:**

Enter the motion controller's port.

**I700 Motion controller:**

Tick this if an i700 Motion Controller is used

**Path to backup folder:**

Enter the path to the default backup folder of the Microsoft SQL server.  
Which is often found here:  
"C:\Program Files\Microsoft SQL Server\MSSQL.1\MSSQL\Backup"  
The path is language-dependent.

**Automatic backup:**

Enter a start date and how often to backup automatically.

**Automatic delete backup:**

If this function is ticked, the program will delete all saved backup files with the exception of the most recent number of backup files given in the field "keep".

**Choose language:**

Enter the desired language for the forms

**Special:**

This button activates a dialogue box in which it amongst other things is possible to import robot program data from the PcRobot.

**Save log:**



Click the button to save the information gathered concerning communication to the motion controller. A file named "log.csv", containing all the (except status) latest (10.000) telegrams sent.

**Edit texts:**

Click the button to edit all the texts in the forms and dialogue boxes. See page 41.

**Graphic angle offset:**

This setting determines how to show the bold red line, illustrating the angle, in the graphic presentation of the working area of the robot.

Seen in relation to the center of the carousel 0° horizontal is to the right.

If the offset is set to 90°, the red line will be shown as vertical.

**Graph angle direction:**

To obtain a "true" visual of the bold red line, illustrating the angle, it may be necessary to change this setting so that the rotation direction is correct.

**Graph flip left-right:**

This setting flips the graph in the main form, so the left and right are reversed (mirroring).

**Graph flip up-down:**

This setting flips the graph in the main, so up and down are reversed.

**Persistence:**

This setting determines the number of samples shown as persistence, when the graph is illustrated on the main form.

**Oscilloscope width**

This setting determines the number of seconds to be displayed in width, when the oscilloscope graph is illustrated on the main form.

## Setup - Carousel

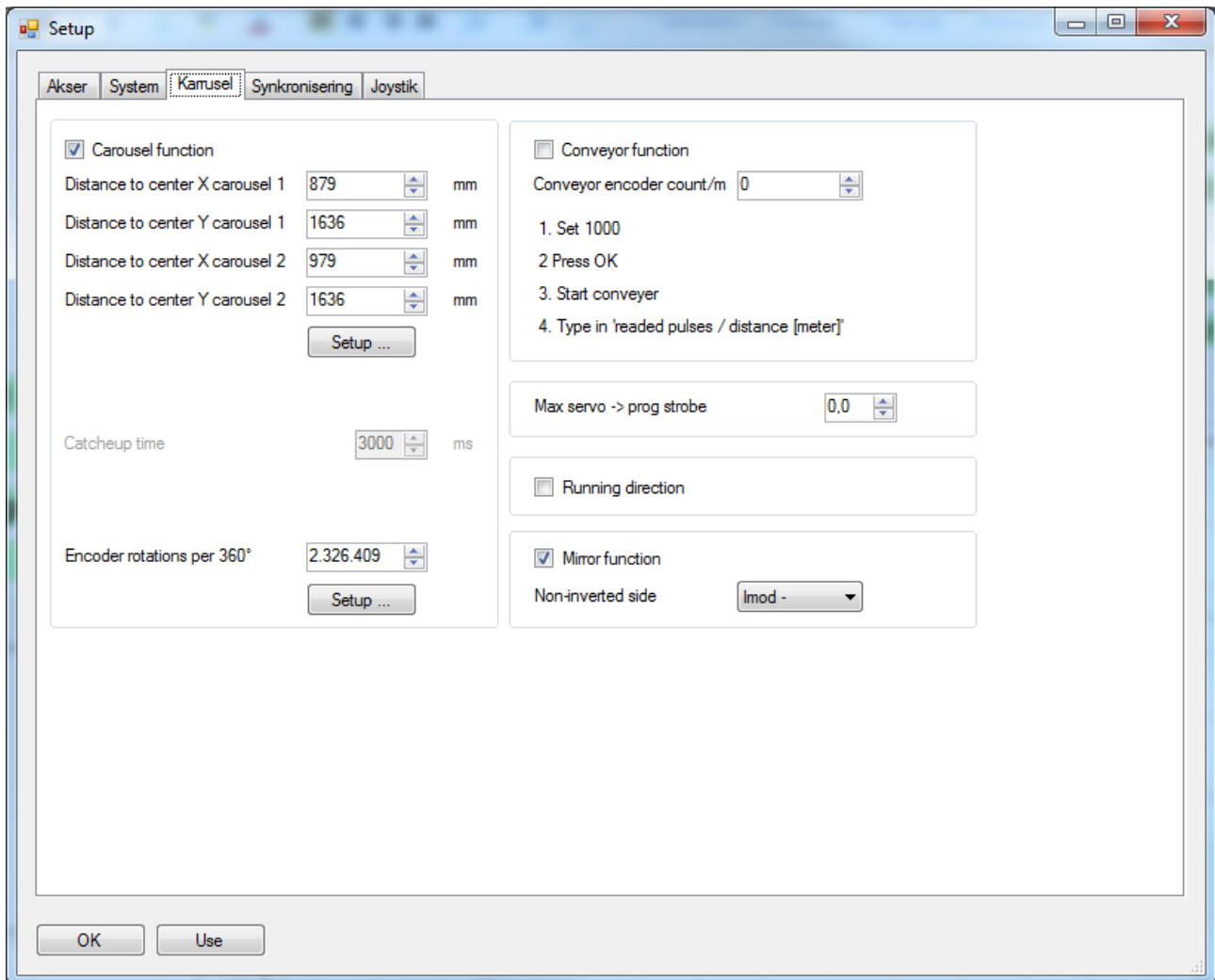


Figure 30 Setup - Carousel

### Carousel function:

Tick this field to activate the carousel function.

### Distance to center X carousel 1:

The value of this field, is value axis 1 (X-axis) would have, if it were possible to position the robot exactly over the center of the carousel.

Normally, the center of the carousel is outside the working area, and then the value would be read (axis 1) when the robot is positioned exactly on the point in the working area where the line segment from the robot to 0,0 meet the line segment from the robot to the center of the carousel, and the 2 line segments are at a right angle.

### Distance to center Y carousel 1:

The value of this field, is value axis 2 (Y-axis) would have, if it were possible to position the robot exactly over the center of the carousel.

Normally, the center of the carousel is outside the working area, and then the value would be read by measuring the distance to the center of the carousel, when the robot is positioned exactly on the point in the working area where the line segment from the robot to 0,0 meet the line segment from the robot to the center of the carousel, and the 2 line segments are at a right angle.

**Distance to center X carousel 2:**

As the field “ Distance to center X carousel 1”, but for carousel 2.

**Distance to center Y carousel 2:**

As the field “ Distance to center Y carousel 1”, but for carousel 2.

**Carousel setup:**

By clicking this button a dialogue box will appear, where it is possible to calculate the center of the carousel from the 3 points of a conceived circle around the center.

See the dialogue box ”Calculate carousel center” page 42

**Servo strobe offset:**

This value is a fixed value added to each program’s ”servo angle” (see page 11). It can be advantageous to use this value, if the mould is always placed in the same spot (at the same angle relative to the servo strobe).

**Max servo -> prog strobe:**

If the carousel runs outside this angle from when the servo strobe is detected and until the program strobe is detected an error will occur. The control of this angle has to address a situation where the robot has to catch up to an incorrectly large angle.

**Encoder pulse per round:**

This value is used to convert the pulses from the carousel into an angle. The measuring of the number of pulses in a round is done in the form ”Carousel setup” see page 43

**Running direction:**

Using this tick box it is possible to change the sign (plus/minus) of the carousel angle.

**Conveyor function:**

If the robot has to follow the item along Axis 1 (X-axis) and not around the center of a carousel, tick this function. Instead of specifying a programming angle (Servo angle), specify a conveyor offset for programming of the robot program.

**Conveyor encoder count/mm:**

This value indicates the number of the pulses in a mm so that the robot follows along axis 1.

**Mirror function:**

When this function is ticked an input on the motion controller will from program to program indicate where the selected robot program has to be run inverted around axis 1 (X-axis).

**Non-inverted side:**

When the ”Mirror function” is selected this field will indicate whether the non-inverted side is position 0 (towards -) or max working length (towards +).

## Setup - Synchronization

The screenshot shows the 'Synkronisering' tab in the WinRobot Setup window. The fields are organized as follows:

	X-Axis	Y-Axis	Z-Axis	Akse4	Akse5	Akse6
Sequence	3	2	1	0	0	0
Direction	Imod -	Imod -	Imod -	Imod +	Imod +	Imod +
Sync position (mm)	77.3	44.0	5.0	0.0	0.0	0.0

Below the table, there is a checkbox labeled 'Middle synchronization' which is currently unchecked. To its right is a dropdown menu labeled 'Half flange place' with 'Imod +' selected.

At the bottom of the dialog are 'OK' and 'Use' buttons.

Figure 31 Setup - Synchronization

### Sequence:

The fields indicate the order in which the axes must be synchronized. If axis 3 (Z-axis) is to be synchronized first select 1 in this field. And subsequently 2 and 3 in the fields (axes) which are to be synchronized next.

If all axes are to be synchronized simultaneously, select 0 in all the fields.

### Direction:

These fields indicate the direction in which the synchronization position is found.

The options are "towards -" and "towards +". "towards -" meaning the lowest (0) position, and "towards +" meaning the highest position (max working length).

### Sync position (mm):

These fields indicate the position of the synchronization. When the synchronization is complete the value will be set to the is-value (current position).

### Middle synchronization:

When this field is ticked it means that the synchronization position for axis 1 (X-axis) is found in the middle of the working area. In this case a flange will be placed along axis 1 (X-

axis) that goes from one end stop and out to the middle of the working area. The synchronization position is the place where the motion controller “sees” the index-pulse from the motor (for the first time) after passing from the flange to the area without a flange.

**Half flange place:**

This field indicates which end the flange is placed. The options are “towards –” an “towards +”.

## Setup - Joystick

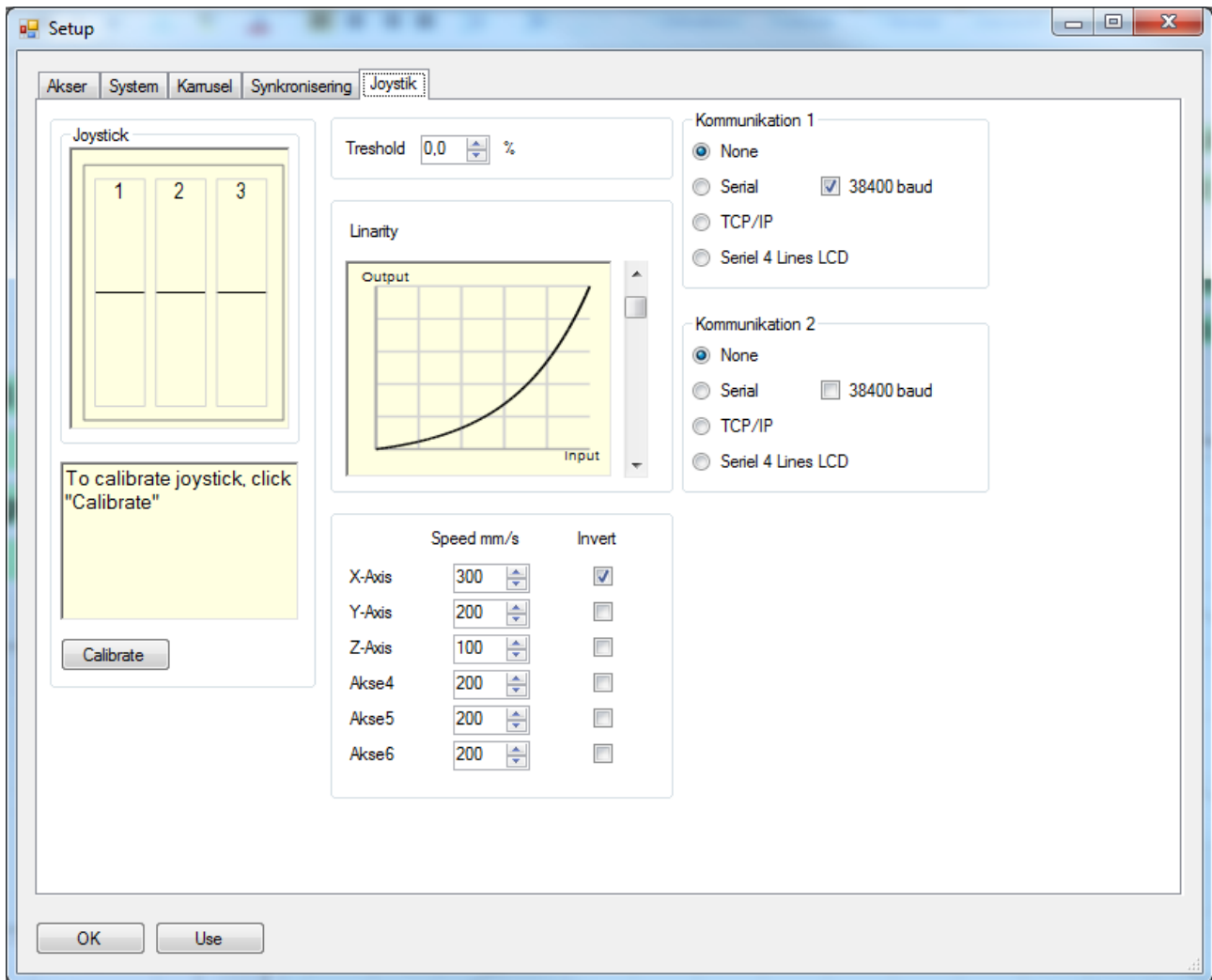


Figure 32 Setup - Joystick

### Threshold:

The joystick can be moved from -100% to +100% for each axis. When the joystick is at rest the signal will be close to 0. In order to prevent that the robot moves by a little possible offset, this field will indicate how much the joystick has to be moved before the value is accepted as a desired speed change.

### Speed mm/s:

This field indicates which speed is imposed on each axis at full control of the joystick.

### Invert:

This field makes it possible to invert the direction of the movements of the robot, making it feel "natural" to use the joystick.

### Calibrate:

By clicking this button the user will be guided through how to calibrate the joystick.

**Linarity:**

By using the control on the right hand side it is possible to make the movements of the joystick more or less nonlinear. In high non-linear mode, the robot is controlled much better at low speed around the center of the joystick.

## About

Shows the database version.



Figure 33 About



## Edit Texts

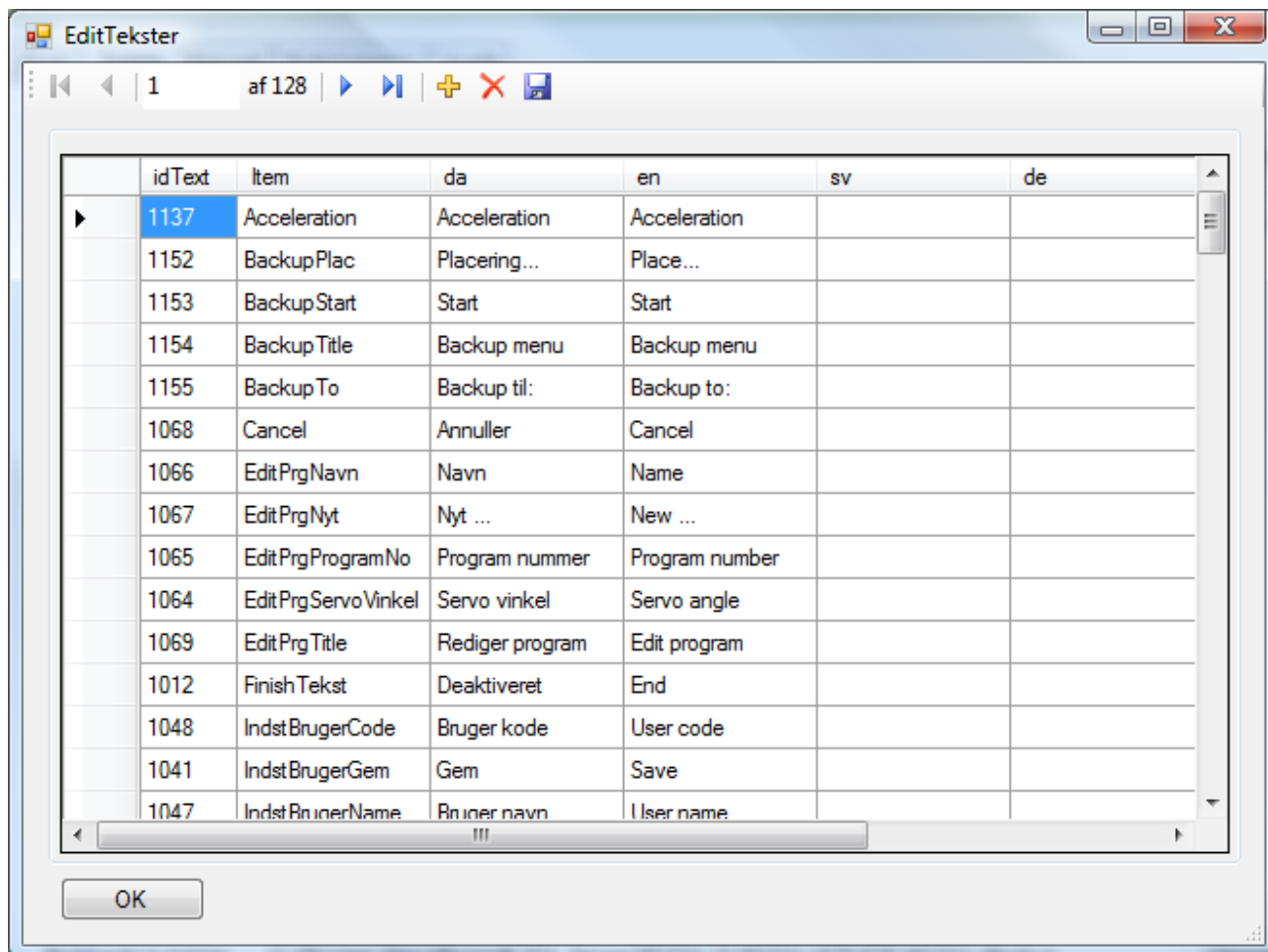



Figure 34 Edit Texts

All texts/captions in the forms and dialogue boxes in WinRobot can be edited in this form.

The values in the columns "idText" and "Item" cannot be edited.

Then follows the columns for each individual language. Find the desired text, double click in the field (or press <F2>) and edit the text..

Remember to save any changes by clicking the little floppy disk symbol  on the far right of the toolbar.

The contents of the table can be sorted by clicking the column header. Each click will sort the column in the opposite order.

## Calculate Carousel Centre

**Beregn karrusel Center**

**Input**

Point 1  
X: 0,00 Y: 500,00 ☐ Joystick Angle: 0,000

Point 2  
X: 698,40 Y: 258,00 ☐ Joystick Angle: 35,840

Point 3  
X: 1452,30 Y: 505,60 ☐ Joystick Angle: 74,505

**Calculation**

**Center**  
X: 722,47  
Y: 1456,25

☐ Transfer as carousel center 1  
☐ Transfer as carousel center 2

OK

**Figure 35 Calculate Carousel Centre**

In this dialogue box it is possible to "calculate" the center position of the carousel, which is used in the settings form. See page 34.

### Procedure:

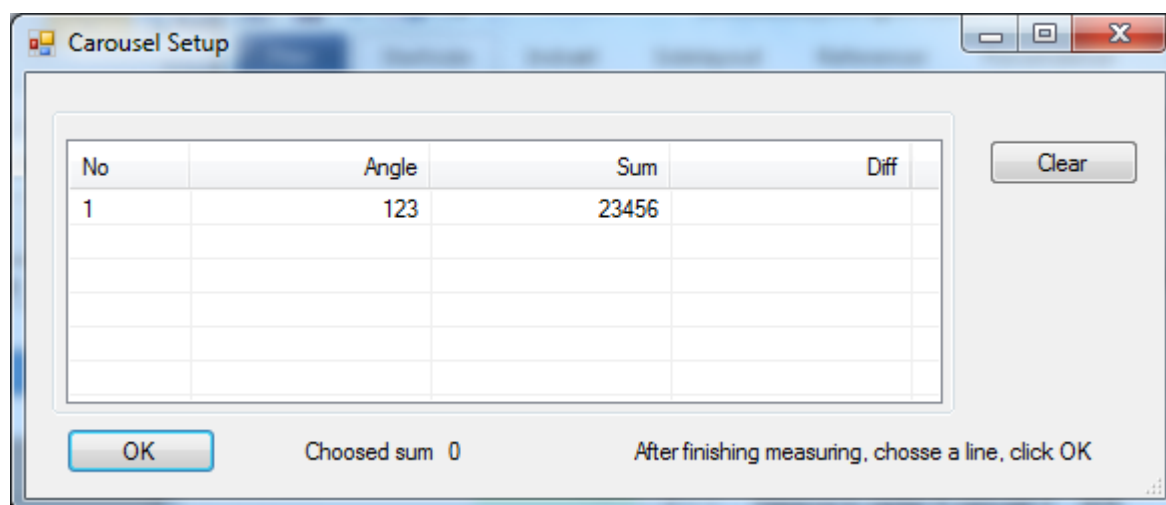
Mount a pointing device (e.g. a laser) pointing vertically down from the middle of the mixing head. Start at "Point 1".

1. Place the robot using the joystick (tick the check box "joystick") at a position with as low an X-value as possible and a Y-value of approx. half the axis length.
2. Mark the point on the carousel where the laser is pointing.
3. Untick the check box "joystick"
4. Turn the carousel so that the mark is placed at approx. half the X-axis length.
5. Repeat step 1 to 3, but with "Point 2".
6. Turn the carousel so that the mark is placed at approx. full X-axis length.
7. Repeat step 1 to 3, but with "Point 3".

Now the "Center X" and "Center Y" fields will indicate the center of the carousel relative to the 0,0 of the robot.

By ticking the check boxes below the center positions the values can be transferred to the carousel center in the settings form. See the "Carousel" pane on the Settings form. See page 34.

## Carousel Setup



**Figure 36** Carousel Setup

This dialogue box makes it possible (and easy) to find the number of pulses coming from the encoder on a whole (360 °) round of the carousel.

Start the carousel.

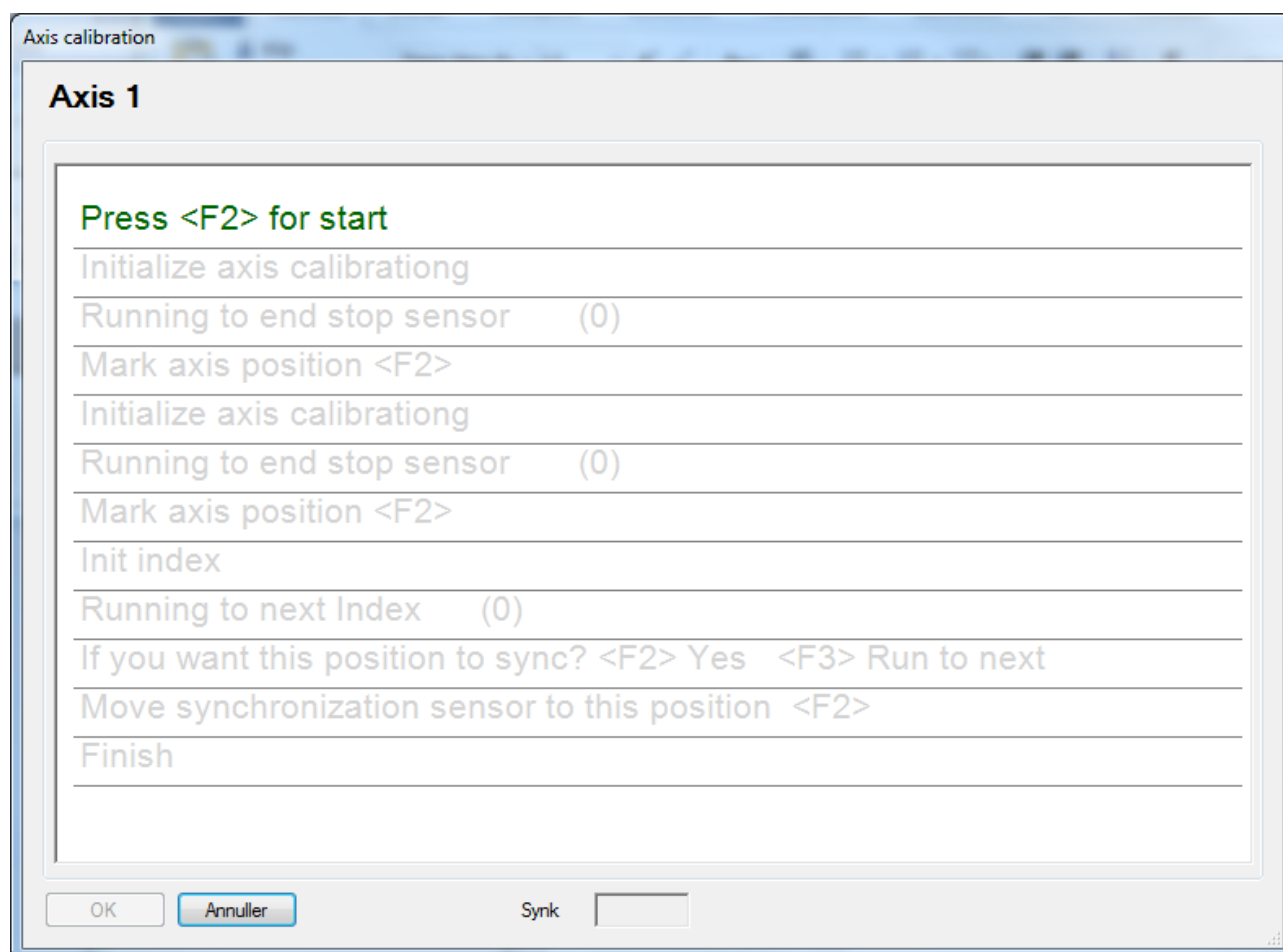
A new line will appear in this dialogue box each time a "servo strobe" is registered.

E.g. if there are 30 mould places on the carousel (12 ° between each) the number in the column "Sum" can be read after 30 lines. This number has to be entered on the "Carousel" tab on the "Settings" form. See page 34.

When the measuring is over the desired line can be marked using the mouse and the "sum" will be transferred to the "Settings" form when clicking "OK".

## Axis Calibration

In this dialogue box the axes can be measured.



**Figure 37 Axis Calibration**

Press <F2> to start a new measuring of the selected axis.

Note! The robot will start to run as soon as <F2> is pressed.

If the synchronization direction "towards +" has been selected in the "Setup - Synchronization" see page 36, the robot will start to run towards –end stop, then towards +end stop, and finally look for index toward -.

If the synchronization direction "towards -" has been selected in the "Setup - Synchronization" the axis will be measured in the opposite direction.

When the line "Mark axis position" appears, a mark is left on the axis, so that the distance is easily measured when another mark is left.

The distance measured is entered in the below dialogue box.

**Figure 38 Axis Calibration Distance**

See technical manual for procedure for axis measuring.

After axis measuring the robot will run to the next index pulse from the selected motor. The index pulse is coming from the motor, and there is only one for each round.

It is important that this index pulse is coming while the axis is within the area of the synchronization sensor.

When the first index pulse is found the robot will stop and WinRobot will ask if the position is OK. If not, press <F3> and the robot will continue to the next index pulse.

## Sync

When the user selects the form "Auto Sync" the telegram "Syncing" is sent to the motion controller. (See page 11)

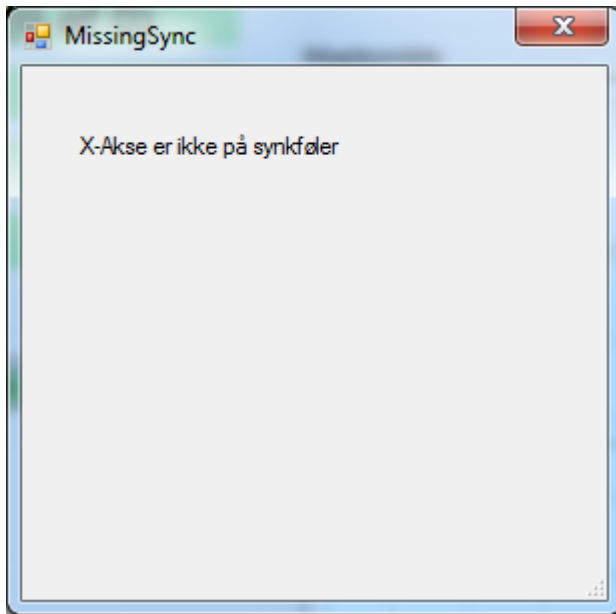
On the tab "Sync" on the form "Settings" (See på side 36) it is possible to select how many axes are to be synchronized simultaneously and/or in which order.

Then WinRobot will wait for the motion controller to set bit 0 in the status bit in the reply telegrams.

When the bit is set, the program will wait until the same bit is 0 again, as a signal that the synchronization is completed.

When the motion controller reports that the task is finished, WinRobot will send a "stop" command.

The WinRobot will check if all the axes are placed on their respective "Sync" sensors. If one or more are not placed on the sync sensor the following dialogue box will appear:



**Figure 39 Missing Sync**

Afterwhich WinRobot will be put into "postBoot" mode and await a new synchronization.

If the synchronization ends successfully WinRobot will send a command putting the motion controller in "LenzeMode" = 1, and WinRobot will continue in the production mode "Waiting for strobe" (See på side 8).